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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,540	10/15/2001	Vahid Tarokh	7000-103	3519
27820	7590	01/05/2006	EXAMINER	
WITHROW & TERRANOVA, P.L.L.C. P.O. BOX 1287 CARY, NC 27512			JUNG, MIN	
			ART UNIT	PAPER NUMBER
			2663	

DATE MAILED: 01/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/977,540	Applicant(s) TAROKH ET AL.	
	Examiner Min Jung	Art Unit 2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-11,13-15,17-19,21-23 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-11,13-15,17-19,21-23 and 25-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 7-9, 13-15, 17-19, 21-23, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al., US 2002/0041635 (Ma).

Ma discloses an OFDM system. Specifically regarding the present claims 1, 7, and 13, Ma teaches a quadrature modulator adapted to generate symbols from data to be transmitted (QAM modulator interleaver 103); a symbol encoder adapted to encode the symbols based on space and time wherein constellation position and timing of the symbols are affected to provide a plurality of series of encoded symbols (STC coding OFDM modulation 105, 107); and a plurality of transmission path, each of which being coupled to one of a plurality of antennas and adapted to modulate one of the series of IFT symbols for transmission from one of the plurality of antennas to provide spatial diversity (the two transmission paths shown by the outputs from the OFDM modulation blocks 105 and 107). Ma fails to specifically teach the transform circuitry adapted to provide a type of Inverse Fourier Transform on each of the plurality of series of encoded symbols to provide a series of IFT symbols. Ma, however, teaches the function of IFT to be performed to modulate the phase and amplitude of the sub-carriers and also space

time code the sub-carriers to incorporate either spatial diversity or temporal diversity between the sub-carriers. See page 2, [0028]. Although Ma lacks the specific teaching of IFT circuitry, Ma teaches employing an IFFT function as described above. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to implement Ma's system by employing a transform circuitry to provide IFT on the encoded symbols since Ma teaches the function of IFT.

Regarding claims 2, 8, and 14, Ma further teaches cyclic extension circuitry in each of the plurality of transmission paths and adapted to receive and add cyclic extensions to the IFT symbols prior to modulation and transmission (cyclic prefix insertion at page 2, [0023], and preamble insertion at page 3, [0031]).

Regarding claim 3, 9, and 15, Ma further teaches data encoding circuitry adapted to receive and process the data to be transmitted prior to modulation by the quadrature modulator to facilitate error correction or detection by a receiver of the transmitted data (Encoder Rate matching interleaver 101).

Regarding claims 17-19, 21-23, 25-27, Ma teaches the receiving end as shown in Fig. 7. Specifically, Ma teaches a plurality of antennas (Rx antennas A and B), a plurality of receiving path (the paths showing received data from Rx antenna A and B), transform circuitry (OFDM demodulator 705, 707, see [0047]), interference cancellation circuitry (STC decoder 713 corrects for co-channel interference, see [0047]), a symbol decoder (STC decoder 713), a quadrature demodulator (QAM Demodulator 715), cyclic extension circuitry (OFDM demodulator 705, 707 removes cyclical extensions in the data vector, see [0047]), and a data decoding circuitry (Decoder 715).

3. Claims 4, 5, 10, 11, rejected under 35 U.S.C. 103(a) as being unpatentable over Ma in view of Li et al., US Pat. Publication No. 2003/0169681 (Li).

Regarding claims 4, and 10, Ma as described above fails to teach that the frequency reuse factor with respect to the base station and the at least one additional base station is approximately one. However, Li teaches the concept of making the frequency reuse factor one between two cells (between two base stations). See Fig. 8 and page 7, paragraph 0104. The frequency reuse pattern shown in Fig. 8 represents an ideal frequency reuse pattern, which can be adopted by any cellular system when interference component is taken care of using one method or another. Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to implement the Ma's system by specifically adopting the teaching of Li to make the frequency reuse factor to be one since that represents the most ideal situation in frequency efficiency in cellular systems.

Regarding claims 5 and 11, Ma further teaches OFDM system employing a plurality of base transceiver stations, in which the base stations being synchronized to a common clock signal, is inherent.

Response to Arguments

4. Applicant's arguments accompanying the Declaration under 37 CFR 1.131 filed October 20, 2005, with respect to the rejection(s) of claim(s) 1-28 under 35 USC 112, 102(e) and 103 have been fully considered and are persuasive. Therefore, the rejection

has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a previously cited references, the Ma patent and the Li patent.

Applicant's response necessitated new grounds of rejection, which involve applying the references on 35 USC 103 grounds.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Min Jung whose telephone number is 571-272-3127. The examiner can normally be reached on Monday through Friday 9:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
January 3, 2006

A handwritten signature in black ink, appearing to read "Min Jung", with a stylized, cursive script.

Min Jung
Primary Examiner